



Capitol Restoration



Capitol Complex

Capitol Complex Demographics

- 23 Buildings
- 4.7M SF
- 7 Cafeterias
- 5 Convenience Stores
- 32 Parking Facilities
- 9,000 Employees and State Officials
- 300,000 Visitors Annually



Capitol Building

Constructed: 1896 - 1905

Cost: \$4.5M

Size: 5 Levels, 352,330 Square Feet

Designed by: Cass Gilbert

Constructed by: Butler Brothers Construction

Operated and Maintained by: Department of Administration, Facilities Management Division



Capitol Building

Occupants:

- The Governor & Lt. Governor
- Attorney General
- Supreme Court
- House
- Senate
- Press Corps



Restoration Timelines & Project Delivery Strategy

- Many Years In the Making (Support for Restoration Began in the 1980s)
- Capitol Preservation Commission Formed in 2011
- Authority and Funding to Proceed with the Restoration Received in 2012
- Construction Manager at Risk Delivery Strategy
 - **Architect:** Hammel, Green and Abrahamson (HGA)
 - **Construction Manager:** JE Dunn
- Cost: \$310M
- Duration: 40 Months (August 2013 – December 2016)



Design

MEP Systems

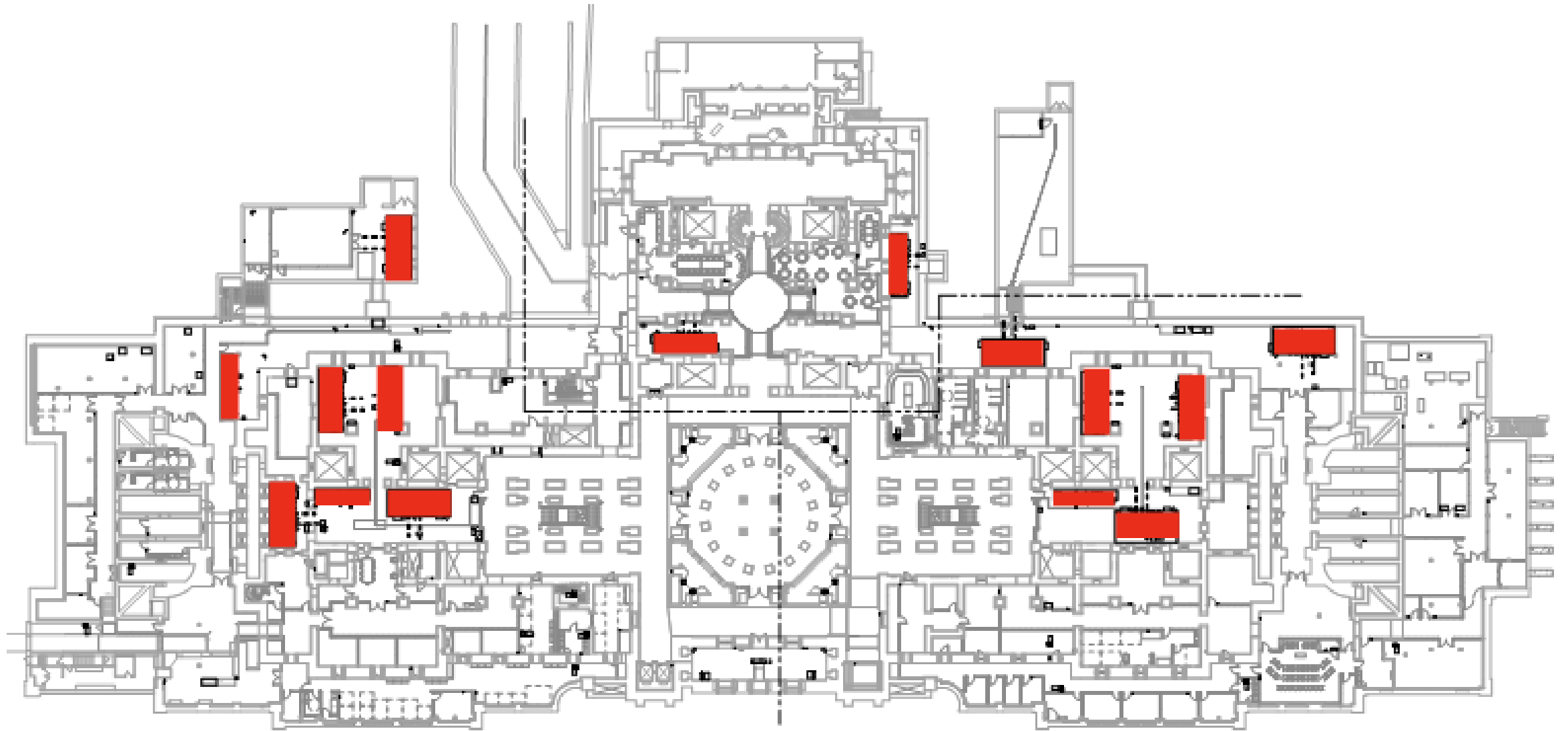


Project Background and Goals

- Modernize systems to a state of the art office building
 - Improve energy efficiency
 - Improve thermal comfort
 - Improve life safety
- Preserve/Restore the existing historical fabric of the building

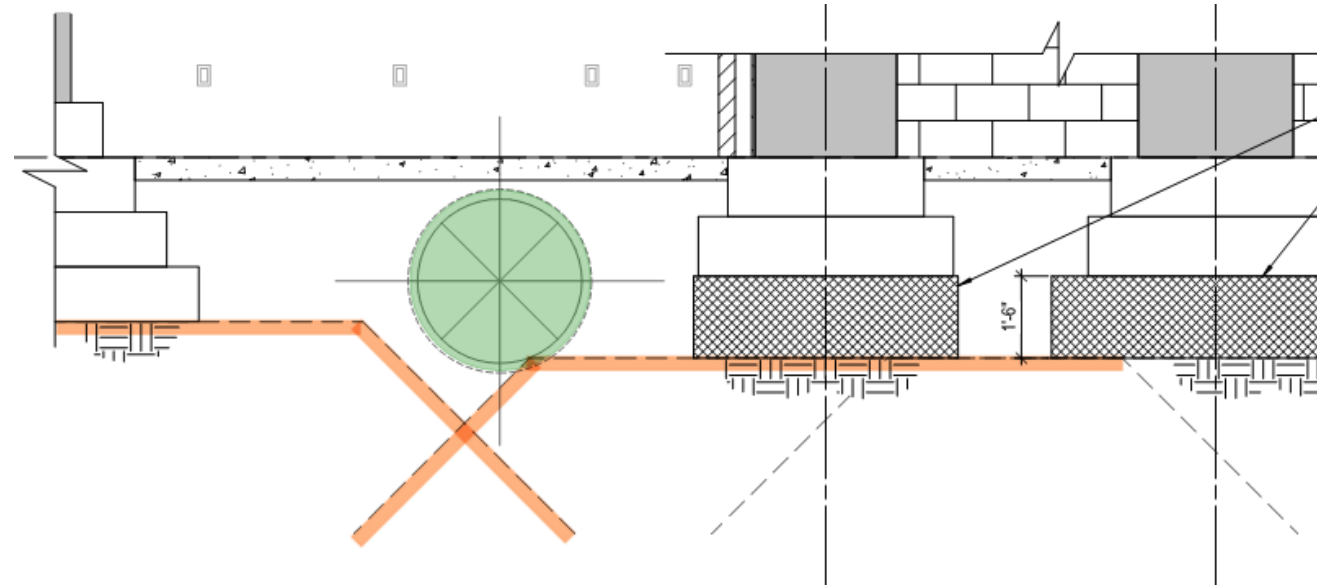


Mechanical Systems



Basement MEP Spaces

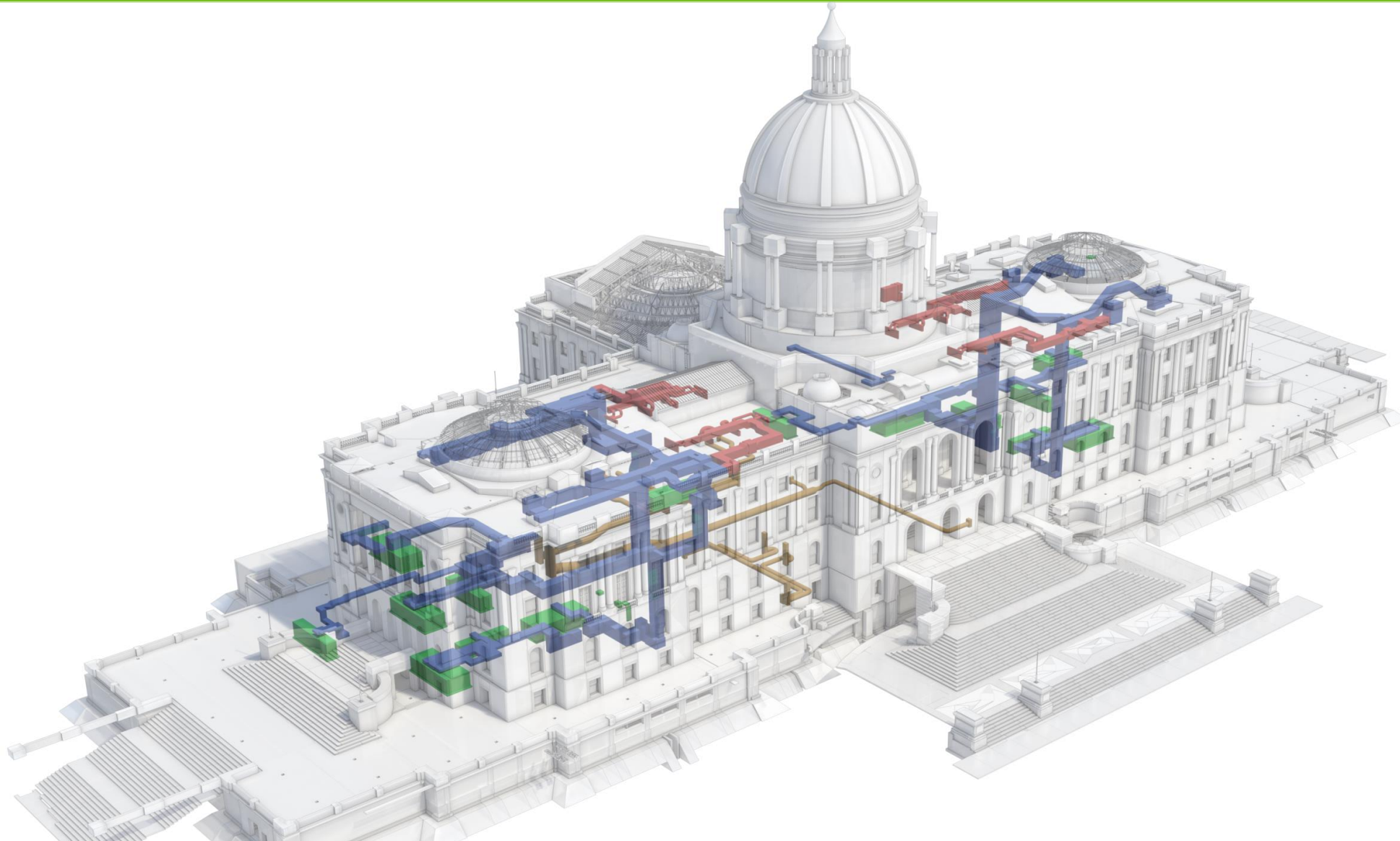
- Underground ductwork coordination
- Conduit buried below basement floor
- Underpinning of the existing foundation



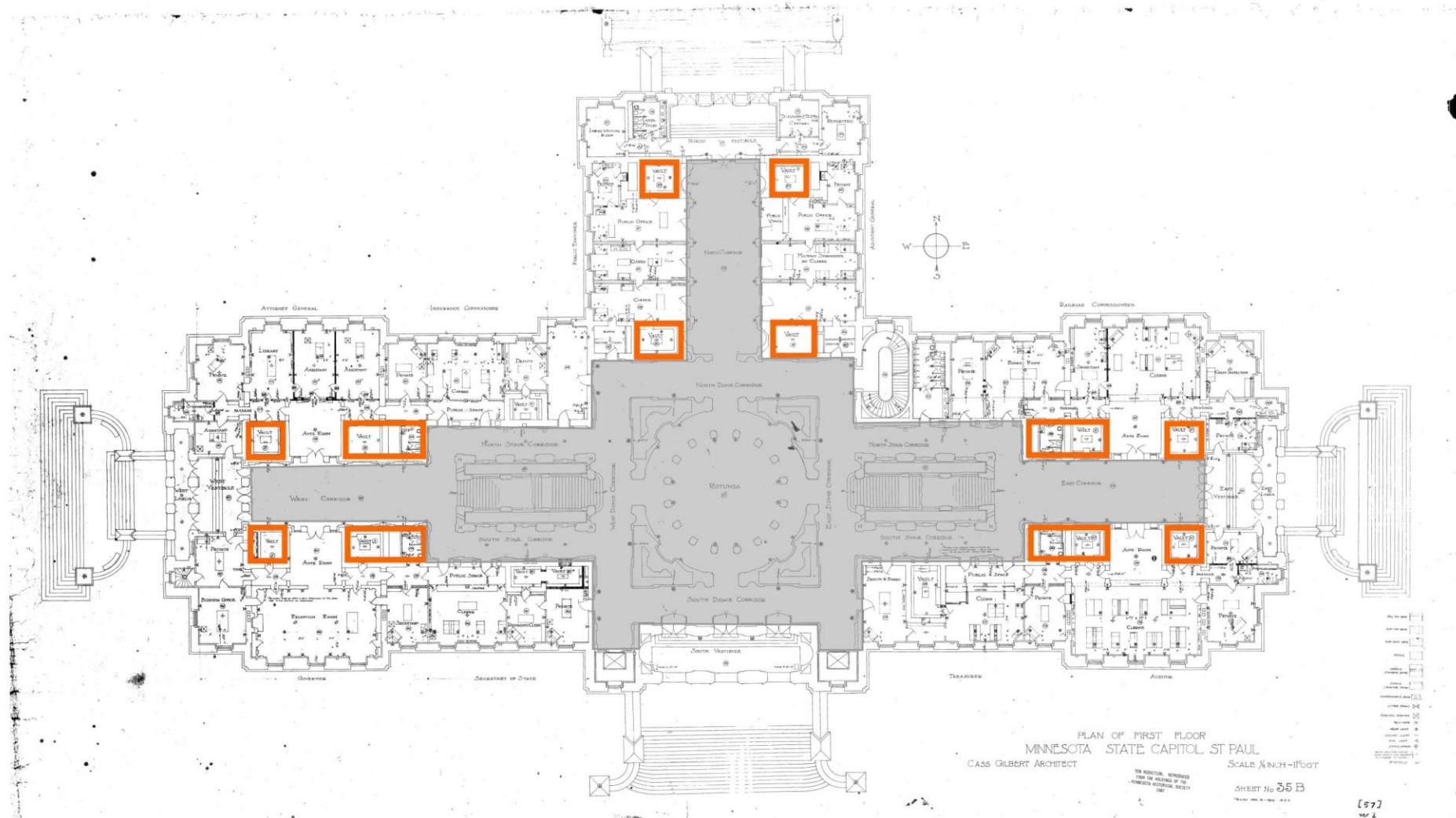




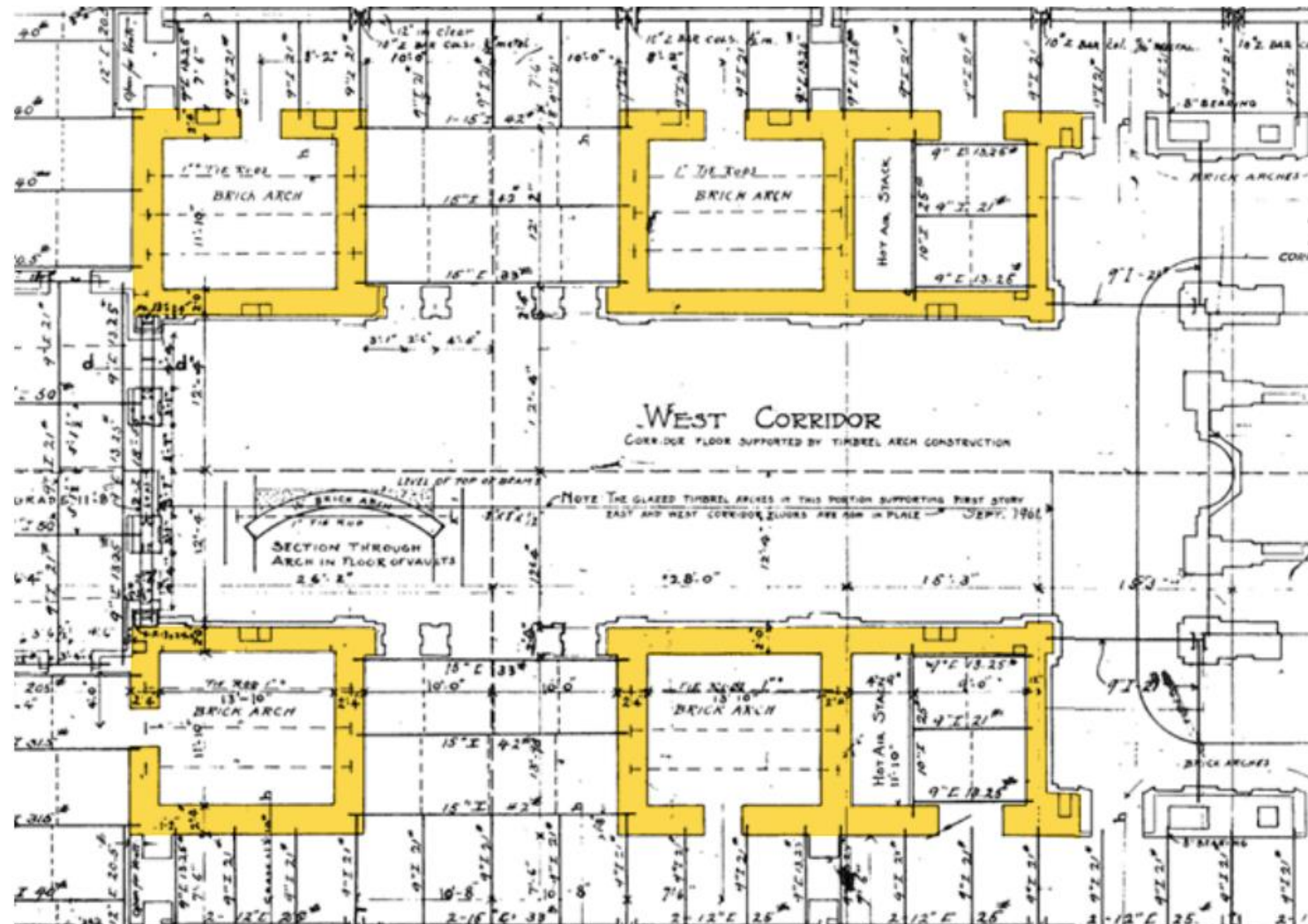
Vertical Pathways



Vertical Pathways



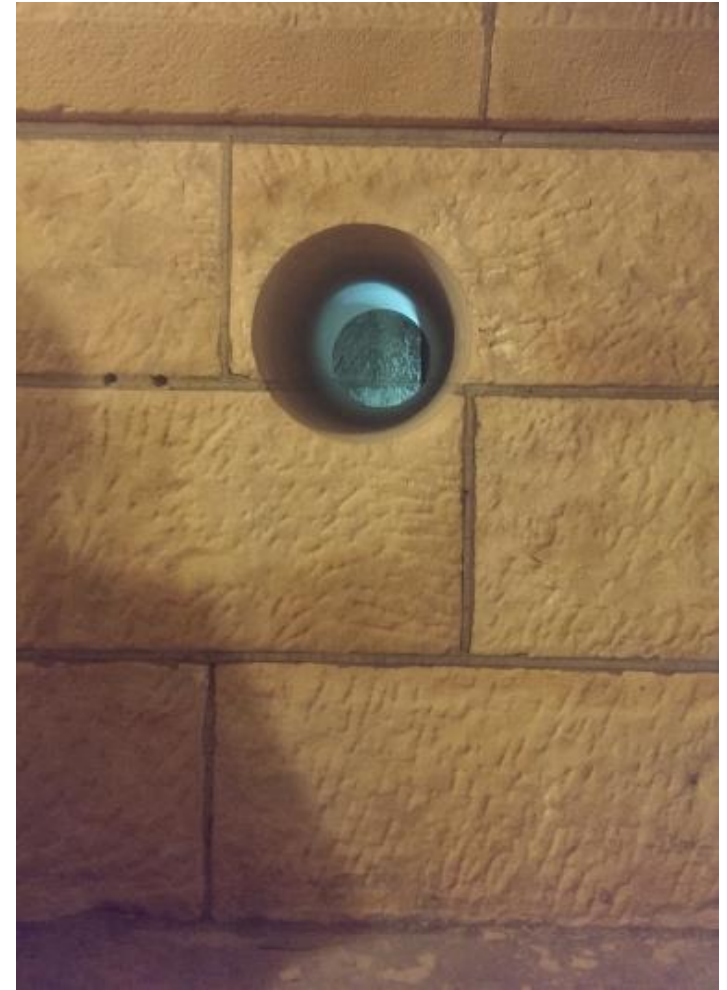
Vertical Pathways



Vertical Pathways



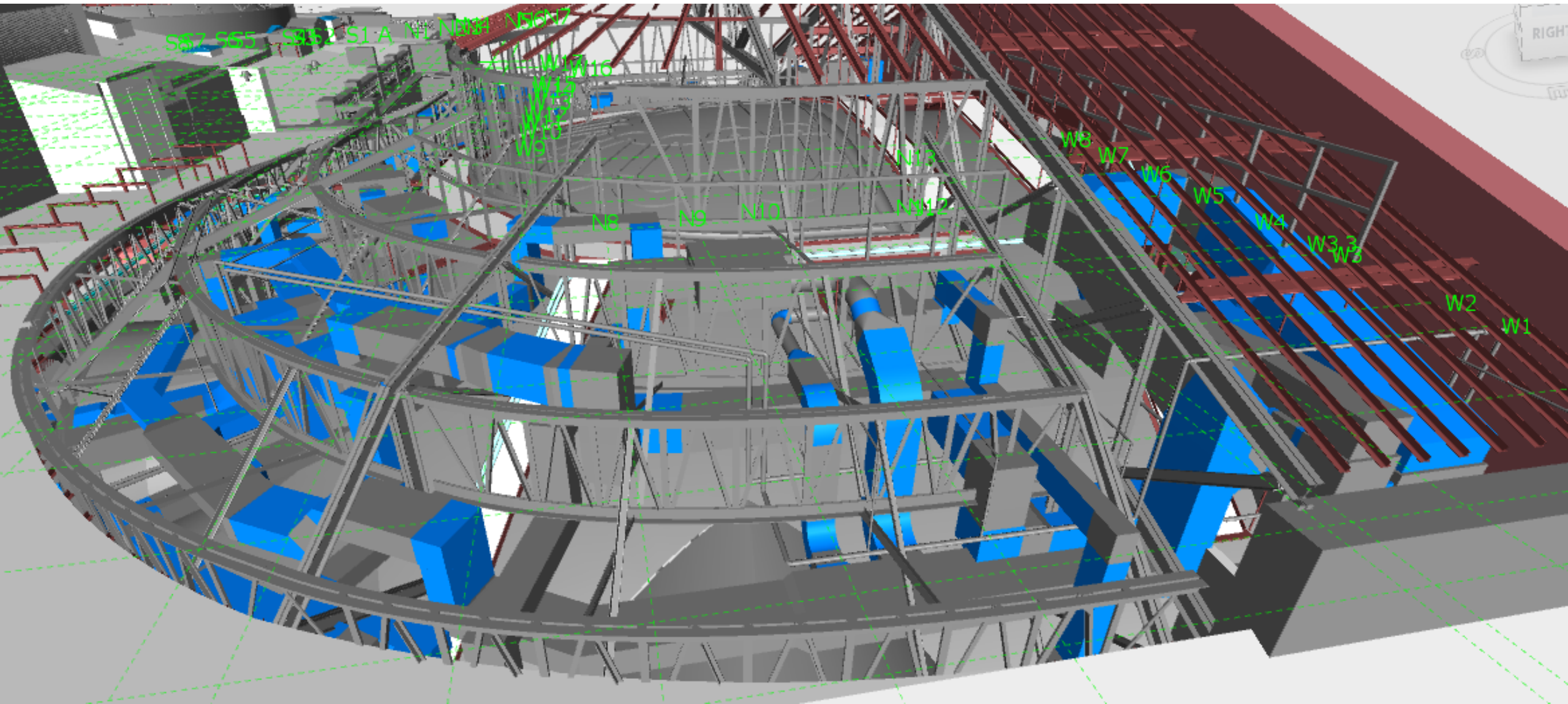
Vertical Pathways



Attic Equipment Access

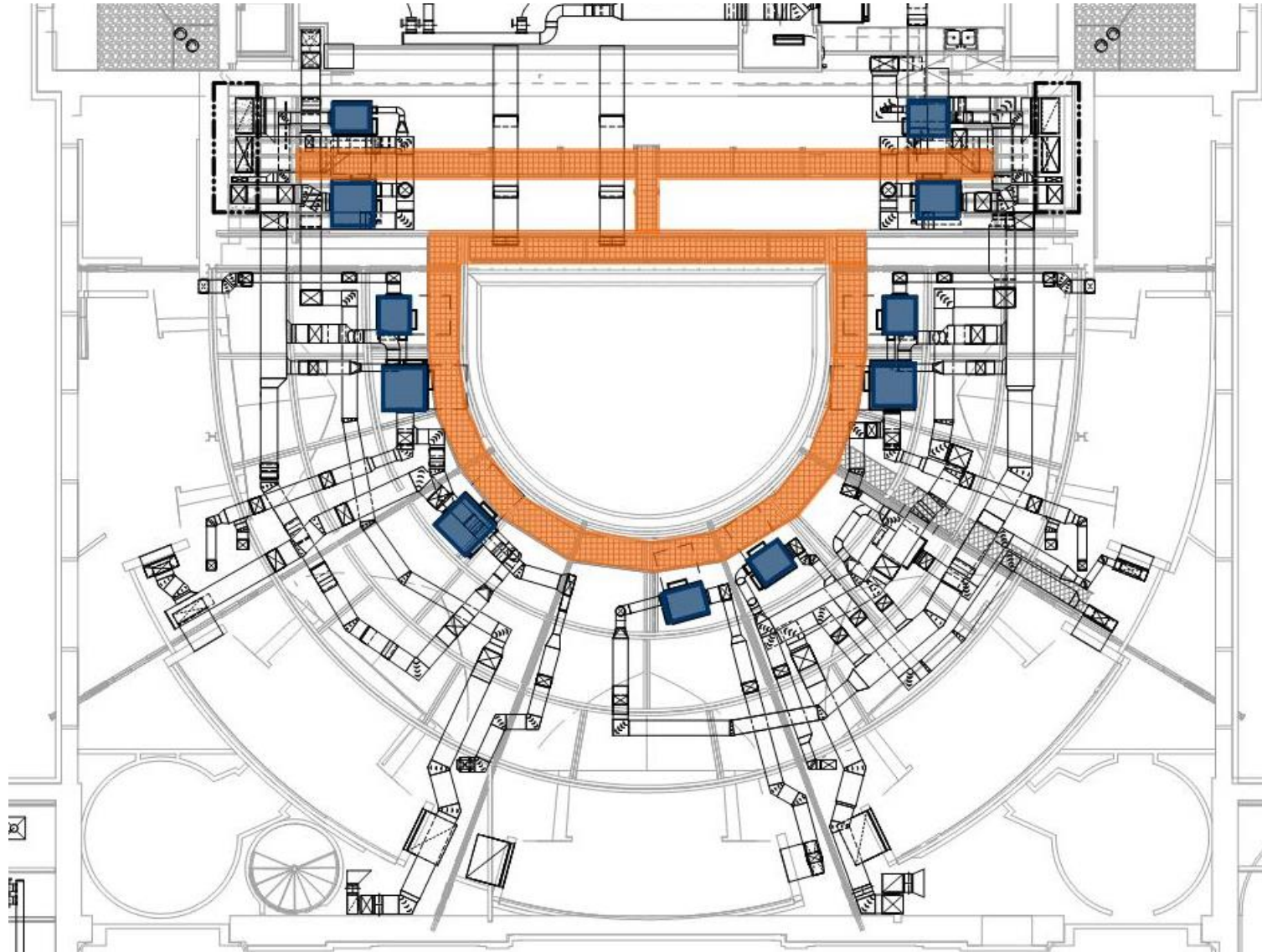


Attic Equipment Access



Attic Equipment Access

- Structural Catwalks
- Equipment Access
 - Filter
 - Coil
 - Motor
 - Control Valve





TO BE SELF-EVIDENT
CERTAIN • INVALIDABLE • RIGHTS • NOT
MODERATION • TEMPERANCE • FRUGALITY • AND

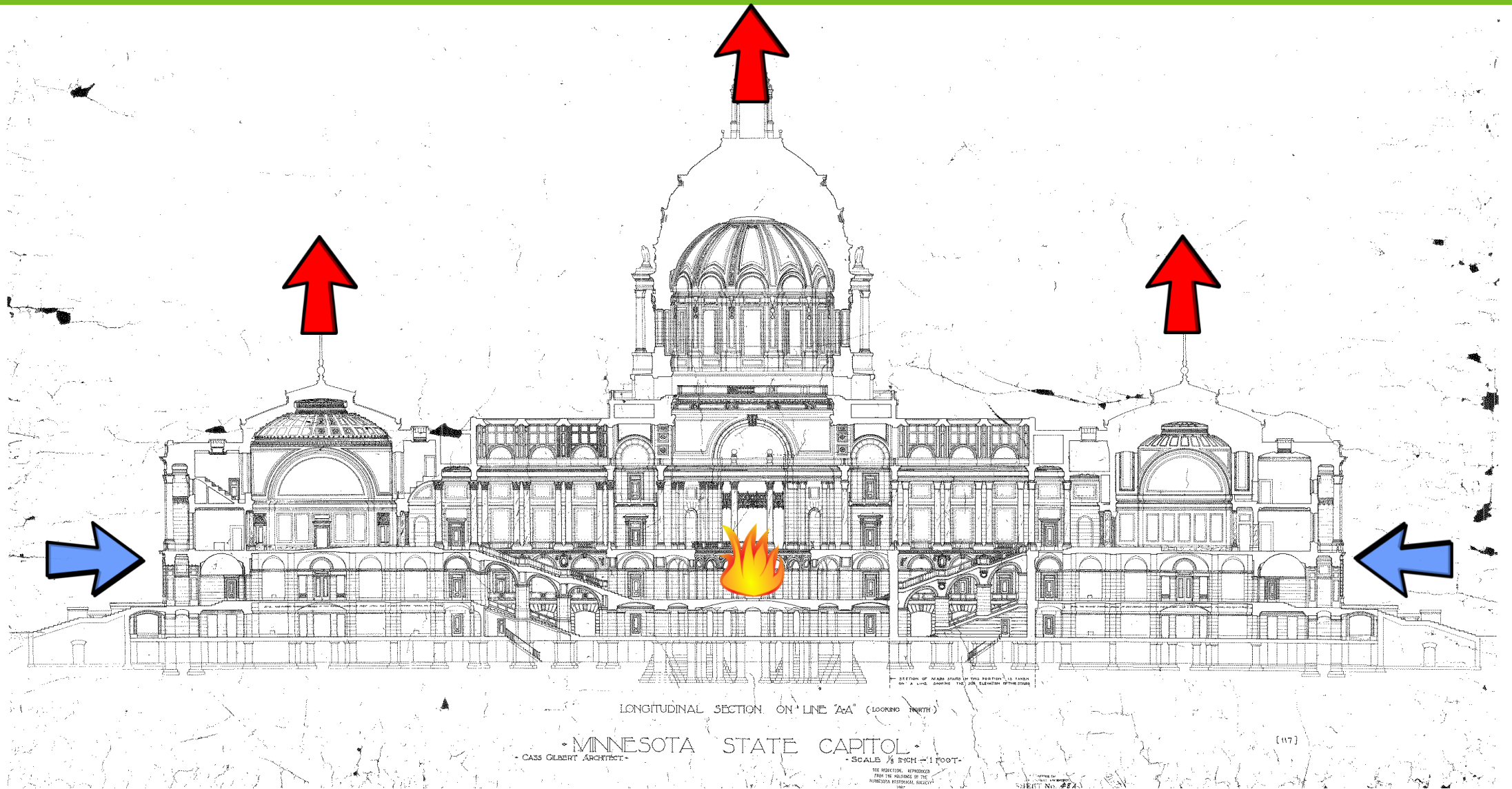
VOX POPULI

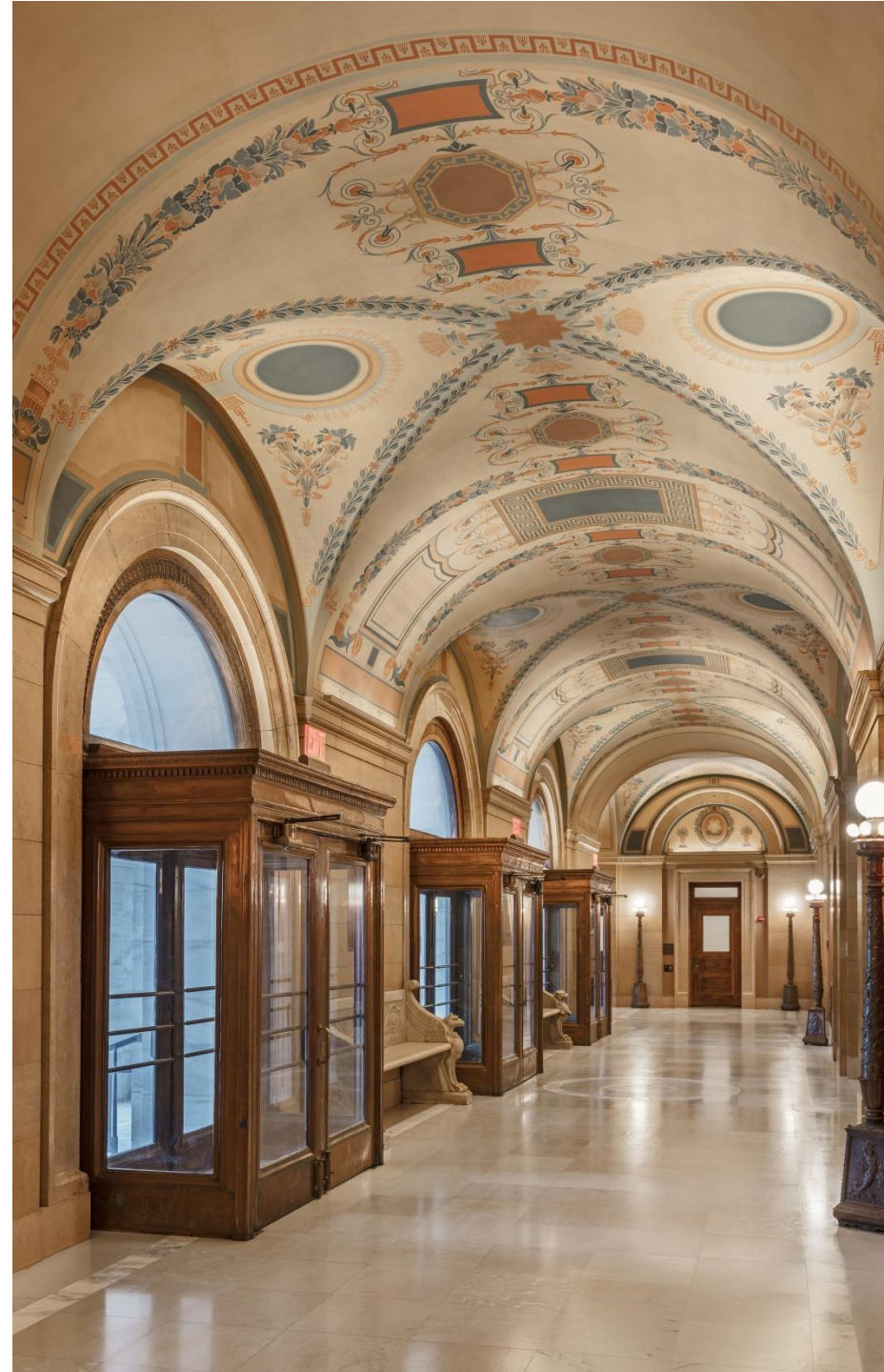
THE WALL OF THE HOUSE
BUILT THE FOUNDATION OF LIBERTY

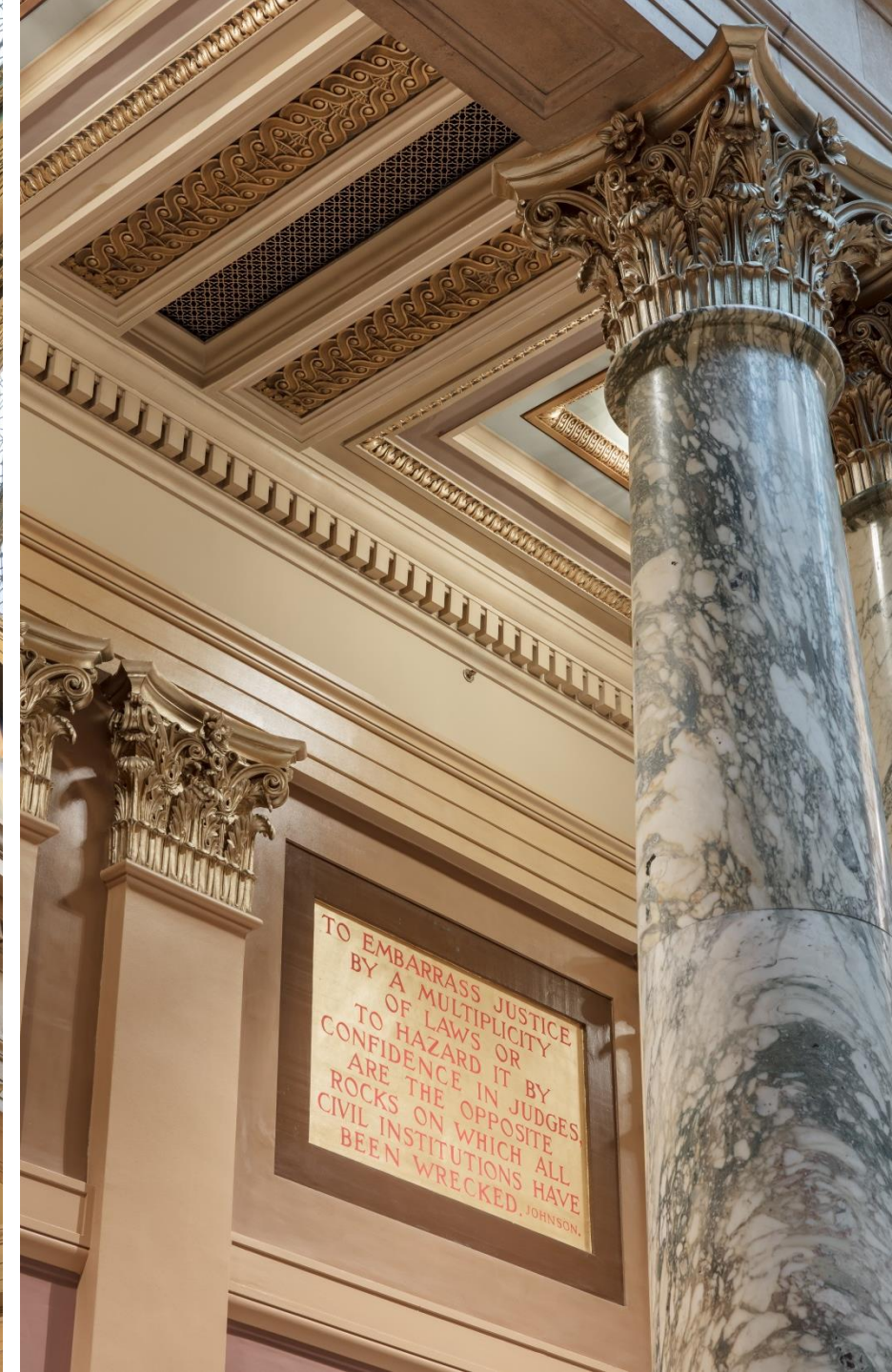
Michigan State Capitol
Lansing, Michigan

1847

Improved Life Safety: Smoke Evacuation System



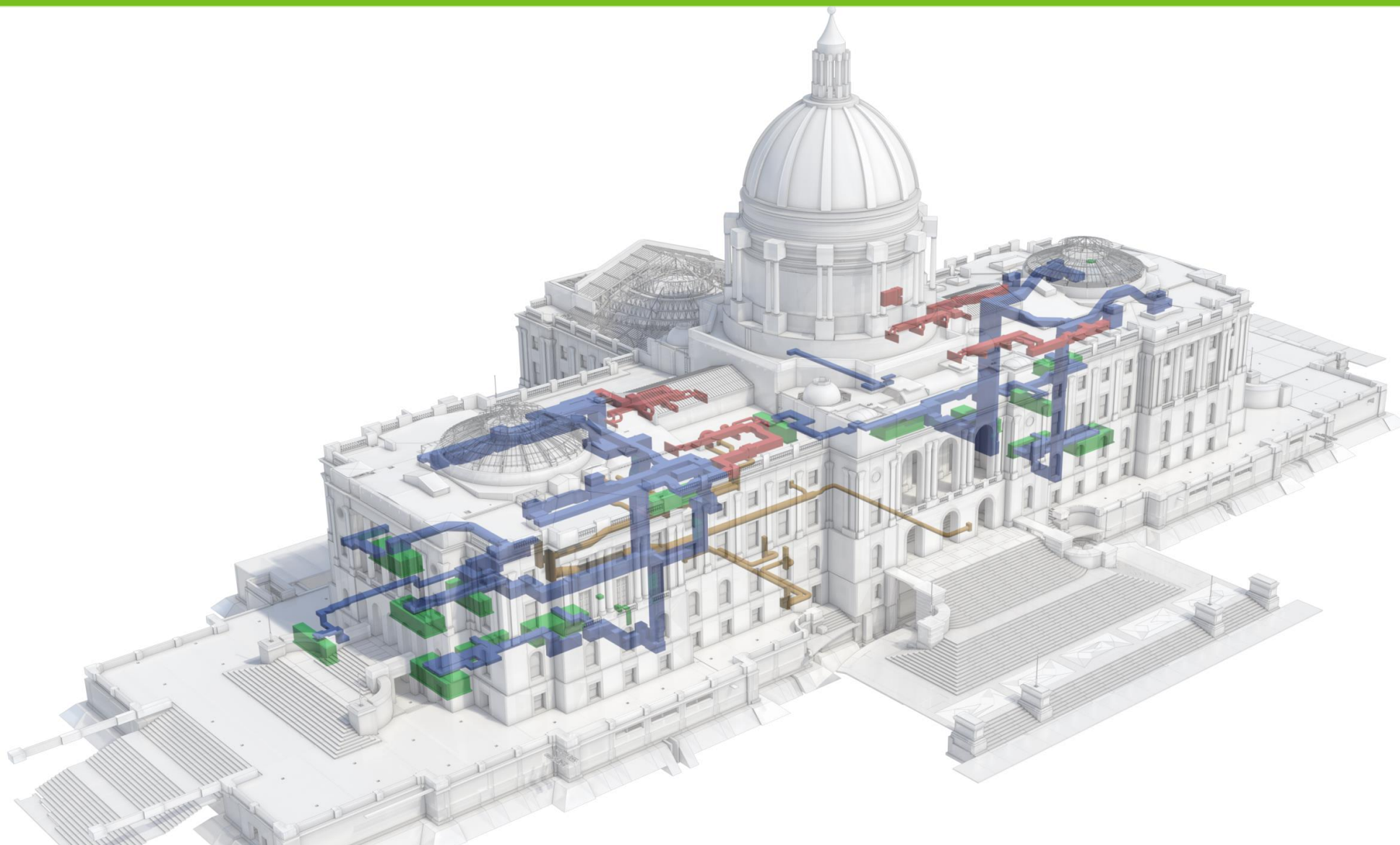




TO EMBARRASS JUSTICE
BY A MULTIPLICITY
OF LAWS OR
TO HAZARD OR
CONFIDENCE IN JUDGES
ARE THE OPPOSITE
ROCKS ON WHICH ALL
CIVIL INSTITUTIONS HAVE
BEEN WRECKED. JOHNSON.

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Improved Life Safety: Outside Air



Improved Life Safety: Emergency Lighting





Construction

Operations

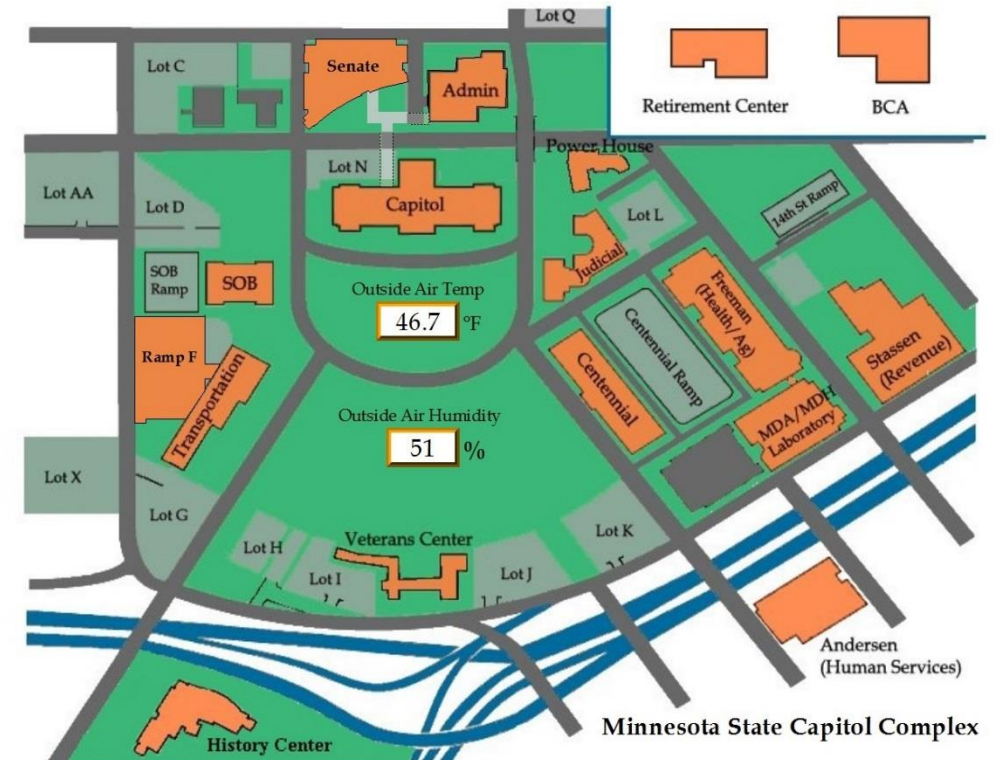
Capitol Complex Automated Systems

- Honeywell Enterprise Building Integrator (EBI)
- Integration of HVAC & Automation, Security & Access Control, UL Fire Alarm
- 16+ Buildings. Over 90,000 data points.
- Monitored 24/7 by Capitol Security
- State Capitol Building
 - Before: 1274 data points
 - After: 12180 data points
 - Seamless Integration into existing system

- Outdoor Lighting
- Indoor Lighting
- Power

- Governor's Res
- JJ Hill House
- Ely Revenue
- Grove Street
- Fleet Services

- Fan Summary
- Sched Override
- Eng AHU Shutdown
- Paging System



Capitol Building AHU Custom Graphics

Station - R430 - Capitol Air Handling Unit 12 Summary Page(CAP_AHU_12.htm)

Honeywell Building Solutions

Minnesota State Capitol
AHU 12
 Serves East Wing Basement Offices

OA Humidity 79.4 % OA Temp 2.0 °F

Sequence of Operation **i**
 Set Points **i**

Fire Alarm **Normal**
 Smoke Evac **Disable**
 VAV Smoke Evac **Normal**

Menu Complex VAV's

Occupancy Occupied
 System Enable Enable
 VAV Occupancy Occupied

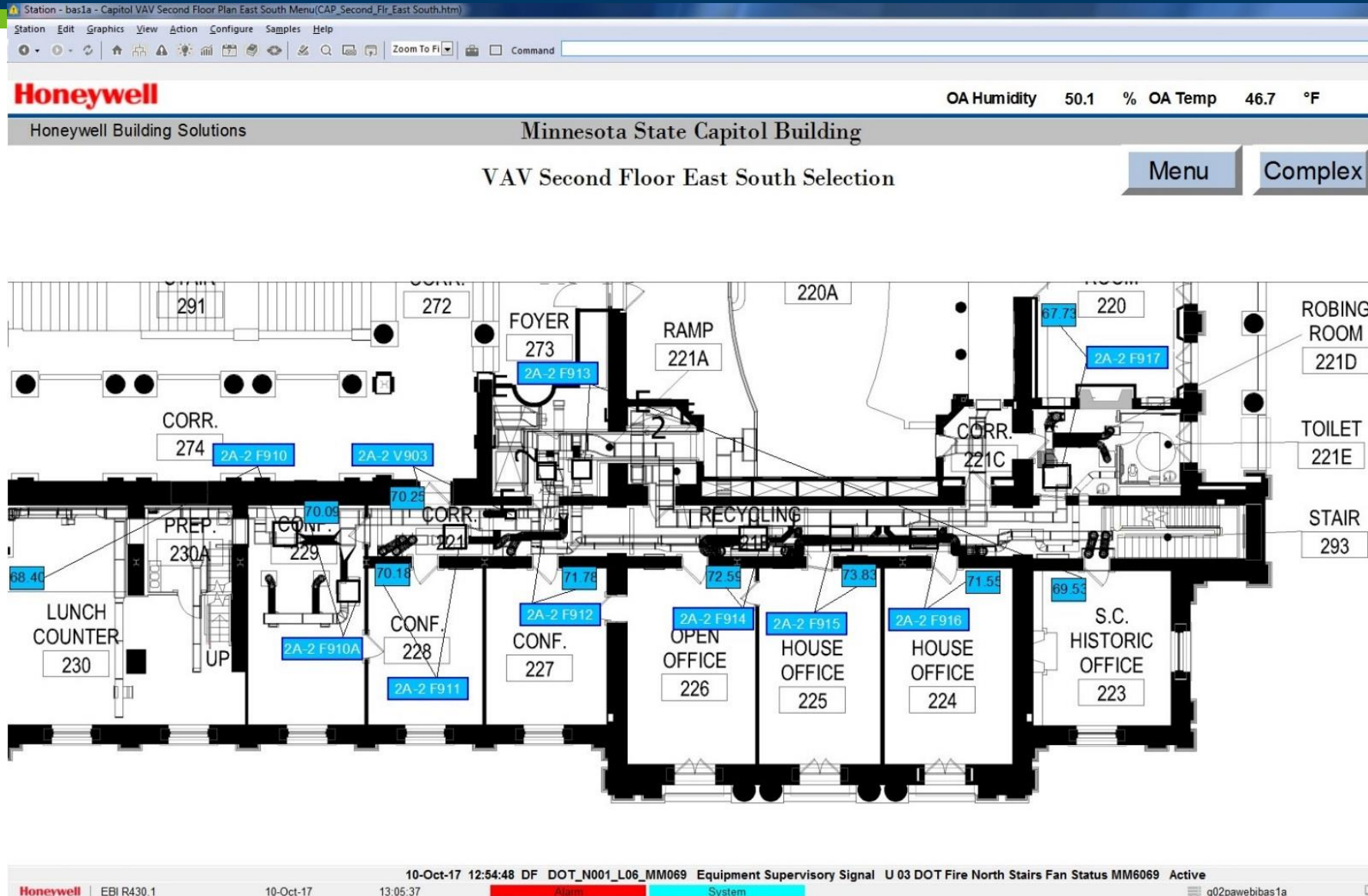
SA Duct Static 1.50 inw
 Duct Static AVG 1.49 inw
 Use Static AVG: UseRawVa

RFVFD's 68 °F On 437 PPM 800 PPM
 97 %
 12947 CFM
 EA 97 %
 20 % 35 %
 OA MIN OA 89 % 90 %
 Normal 18 %
 0.05 inw 61 °F Normal
 SFVFD's 1.53 inw Normal 64 °F 64 °F
 5059 CFM SA 1.50 inw
 Humidifier 0 % Enable
 Fan Alm VFD Fault
 12 % 85 %
 AVG 57 °F 50 °F
 60 55
 Economizer Enable 66 °F
 Humidifier Signal 28.16 %
 RARH Hum Ena SP 30 %
 Space Info Space Pressure 0.06 inw
 Space Press Sp 0.03 inw
 DAT SP 65 °F 50 °F
 DAT Reset from RAT Points
 DAT SP is the minimum of these 2 values
 68 °F 76 °F RAT
 65 °F
 DAT Reset from RARH Points
 DAT SP 65 °F 50 °F
 25 % 50 % RARH

08-Feb-17 06:09:10 Caphvac_001 CapEF6BAIm ALARM U 00 Exhaust Fan Failure Alarm Alarm
 Alarm System g02pawebibas1a Stn07 Mng

6:20 AM 2/8/2017

Capitol Building VAV Custom Graphics



Mechanical Systems

- Pre-Restoration

- 26 Air Handling Units
 - Located On All Floors & Roof
 - Outside Air Intake at Ground Level
 - Constant & Variable Volume Fans
 - Limited VAV Boxes
- Pneumatic Control

- Post-Restoration

- 15 Air Handling Units
 - Located in Basement
 - Outside Air Intake Located on Roof
 - Fan Walls
 - 263 VAV Boxes
- Direct Digital Control

Electrical Systems

- Pre-Restoration

- 208 Volt System
- Incandescent/HID/Fluorescent Lighting
- Limited Lighting Control



- Post-Restoration

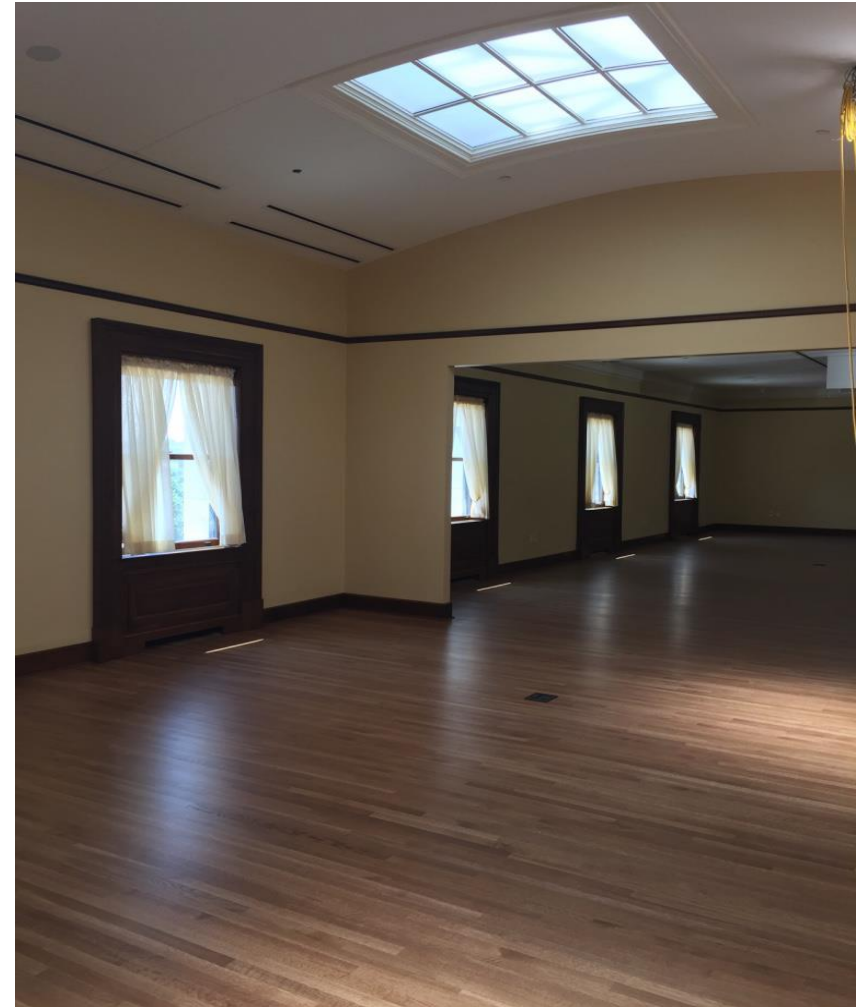
- 480 Volt System
- LED Lighting throughout
- Full Lighting Control System



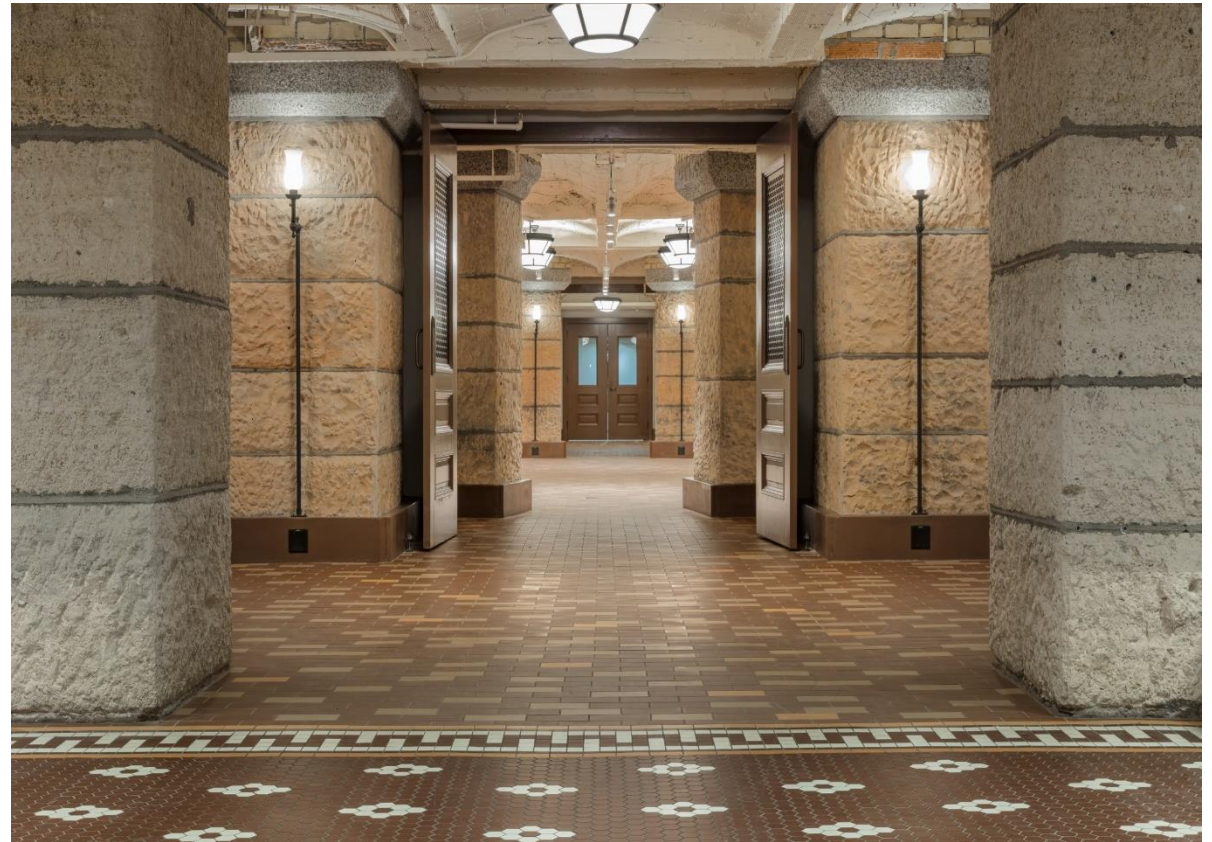
Before & After



Before & After



Before & After



Questions